SECTION 6-11, PRECAST CONCRETE RETAINING WALL STEMS
April 5, 2004

This section including title is revised to read:

SECTION 6-11, REINFORCED CONCRETE WALLS

6-11.1 Description
This work consists of constructing reinforced concrete retaining walls, including those shown in the Standard Plans, L walls, and counterfort walls.

6-11.2 Materials
Materials shall meet the requirements of the following sections:

Cement	9-01
Aggregates for Portland Cement Concrete	9-03.1
Gravel Backfill	9-03.12
Premolded Joint Filler	9-04.1(2)
Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bar	9-07.3
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Water	9-25

Other materials required shall be as specified in the Special Provisions.

6-11.3 Construction Requirements

6-11.3(1) Submittals
The Contractor shall submit all excavation shoring plans to the Engineer for approval in accordance with Section 2-09.3(3)D.

The Contractor shall submit all falsework and formwork plans to the Engineer for approval in accordance with Sections 6-02.3(16) and 6-02.3(17).

If the Contractor elects to fabricate and erect precast concrete wall stem panels, the following information shall be submitted to the Engineer for approval in accordance with Sections 6-01.9 and 6-02.3(28)A:

1. Working drawings for fabrication of the wall stem panels, showing dimensions, steel reinforcing bars, joint and joint filler details, surface finish details, lifting devices with the manufacturer's recommended safe working capacity, and material specifications.

2. Working drawings and design calculations for the erection of the wall stem panels showing dimensions, support points, support footing sizes, erection blockouts, member sizes, connections, and material specifications.

3. Design calculations for the precast wall stem panels, the connection between the precast panels and the cast-in-place footing, and all modifications to the cast-in-place footing details as shown in the Plans or Standard Plans.

The Contractor shall not begin excavation and construction operations for the retaining walls until receiving the Engineer's approval of the above submittals.

6-11.3(2) Excavation and Foundation Preparation

Excavation shall conform to Section 2-09.3(3), and to the limits and construction stages shown in the Plans. Foundation soils found to be unsuitable shall be removed and replaced in accordance with Section 2-09.3(1)C.

6-11.3(3) Precast Concrete Wall Stem Panels

The Contractor may fabricate precast concrete wall stem panels for construction of Standard Plan Retaining Wall Types 1 through 6 and 1SW through 6SW. Precast concrete wall stem panels may be used for construction of non-Standard Plan retaining walls if allowed by the Plans or Special Provisions. Precast concrete wall stem panels shall conform to Section 6-02.3(28), and shall be cast with Class 4000 concrete.

The precast concrete wall stem panels shall be designed in accordance with the requirements for Load Factor Design in the following codes:

1. For all loads except as otherwise noted - AASHTO Standard Specifications for Highway Bridges, latest edition and current interims. The seismic design shall use the acceleration coefficient and soil profile type as specified in the Plans.

2. For all wind loads - AASHTO Guide Specifications for Structural Design of Sound Barriers, latest edition and current interims.

The precast concrete wall stem panels shall be fabricated in accordance with the dimensions and details shown in the Plans, except as modified in the shop drawings as approved by the Engineer.

The precast concrete wall stem panels shall be fabricated full height, and shall be fabricated in widths of 8 feet, 16 feet, and 24 feet.

The construction tolerances for the precast concrete wall stem panels shall be as follows:

Height	±¼	inch
Width	±¼	inch
Thickness	+¼	inch
	-1/8	inch
Concrete cover for steel reinforcing bar	+3/8	inch
	-1/8	inch
Width of precast concrete wall stem panel joints	±¼	inch
Offset of precast concrete wall stem panels	±¼	inch

(Deviation from a straight line extending 5 feet on each side of the panel joint)

The precast concrete wall stem panels shall be constructed with a mating shear key between adjacent panels. The shear key shall have beveled corners and shall be 1-1/2 inches in thickness. The width of the shear key shall be 3-1/2 inches minimum and 5-1/2 inches maximum. The shear key shall be continuous and shall be of uniform width over the entire height of the wall stem.

The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surfaces. Special surface finishes achieved with form liners shall conform to Sections 6-02.2 and 6-02.3(14) as supplemented in the Special Provisions. Rolled on textured finished shall not be used. Precast concrete wall stem panels shall be cast in a vertical position if the Plans call for a form liner texture on both sides of the wall stem panel.

The precast concrete wall stem panel shall be rigidly held in place during placement and curing of the footing concrete.

The precast concrete wall stem panels shall be placed a minimum of one inch into the footing to provide a shear key. The base of the precast concrete wall stem panel shall be sloped ½ inch per foot to facilitate proper concrete placement.

To ensure an even flow of concrete under and against the base of the wall panel, a form shall be placed parallel to the precast concrete wall stem panel, above the footing, to allow a minimum one foot head to develop in the concrete during concrete placement.

The steel reinforcing bars shall be shifted to clear the erection blockouts in the precast concrete wall stem panel by 1-1/2 inches minimum.

All precast concrete wall stem panel joints shall be constructed with joint filler installed on the rear (backfill) side of the wall. The joint filler material shall extend from two feet below the final ground level in front of the wall to the top of the wall. The joint filler shall be a nonorganic flexible material and shall be installed to create a waterproof seal at panel joints.

The soil bearing pressure beneath the falsework supports for the precast concrete wall stem panels shall not exceed the maximum design soil pressure shown in the Plans for the retaining wall.

6-11.3(4) Cast-In-Place Concrete Construction

Cast-in-place concrete for concrete retaining walls shall be formed, reinforced, cast, cured, and finished in accordance with Section 6-02, and the details shown in the Plans and Standard Plans. All cast-in-place concrete shall be Class 4000.

The Contractor shall provide the specified surface finish as noted, and to the limits shown, in the Plans to the exterior concrete surfaces. Special surface finishes achieved with formliners shall conform to Sections 6-02.2 and 6-02.3(14) as supplemented in the Special Provisions.

Cast-in-place concrete for adjacent wall stem sections (between vertical expansion joints) shall be formed and placed separately, with a minimum 12 hour time period between concrete placement operations.

Premolded joint filler, 1/2” thick, shall be placed full height of all vertical wall stem expansion joints in accordance with Section 6-01.14.

6-11.3(5) Backfill, Weepholes and Gutters

Unless the Plans specify otherwise, backfill and weepholes shall be placed in accordance with Standard Plan D-4 and Section 6-02.3(22). Gravel backfill for drain shall be compacted in accordance with Section 2-09.3(1)E. Backfill within the zone

defined as bridge approach embankment in Section 1-01.3 shall be compacted in accordance with Method C of Section 2-03.3(14)C. All other backfill shall be compacted in accordance with Method B of Section 2-03.3(14)C, unless otherwise specified.

Cement concrete gutter shall be constructed as shown in the Standard Plans.

6-11.3(6) Traffic Barrier and Pedestrian Barrier

When shown in the Plans, traffic barrier and pedestrian barrier shall be constructed in accordance with Sections 6-02.3(11)A and 6-10.3(2), and the details shown in the Plans and Standard Plans.

6-11.4 Measurement

Concrete Class 4000 for retaining wall will be measured as specified in Section 6-02.4.

Steel reinforcing bar for retaining wall and epoxy-coated steel reinforcing bar for retaining wall will be measured as specified in Section 6-02.4.

Traffic barrier and pedestrian barrier will be measured as specified in Section 6-10.4 for cast-in-place concrete barrier.

6-11.5 Payment

Payment will be made in accordance with Section 1-04.1 for each of the following bid items when they are included in the proposal:

"Conc. Class 4000 For Retaining Wall", per cubic yard.
All costs in connection with furnishing and installing weep holes and premolded joint filler shall be included in the unit contract price per cubic yard for "Conc. Class 4000 for Retaining Wall".

"St. Reinf. Bar For Retaining Wall", per pound.
"Epoxy-Coated St. Reinf. Bar For Retaining Wall", per pound.

"Traffic Barrier", per linear foot.
"Pedestrian Barrier", per linear foot.
The unit contract price per linear foot for "___ Barrier" shall be full pay for constructing the barrier on top of the retaining wall, except that when these bid items are not included in the proposal, all costs in connection with performing the work as specified shall be included in the unit contract price per cubic yard for "Conc. Class 4000 For Retaining Wall", and the unit contract price per pound for "___ Bar For Retaining Wall".